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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,349	07/13/2001	Jay Brian DeDontney	A-67178-1/MSS	7344

7590 05/07/2007

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EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	

MAIL DATE	DELIVERY MODE
05/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/905,349	DEDONTNEY ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 8, 2006, and the grant on petition of April 25, 2007 are entered.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 4, 5, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soichiro Kawakami (JP61037969) in view of Ohashi (JP10-177960)[1]. Soichiro Kawakami teaches a gas delivery metering tube (Figure 1) for delivering a gas in a plasma CVD process comprising:

i. an elongated outer tube (3) having an inlet end (4/3 interface) and a closed end (opposite end), and one or more arrays of orifices (15) formed in the elongated outer tube (3) and extending along the substantial length of the elongated outer tube (3); an elongated inner tube (5) having open inlet (4/5 interface) and outlet (opposite 4/5 interface) ends, the elongated inner tube (5) being nested and axially aligned inside of the elongated outer tube

[1] Machine translation from http://www1.ipdl.jpo.go.jp

(3) forming an effective annular space (20) there between, and wherein the outlet end of the elongated inner tube (5) terminates prior to the closed end (opposite end) of the elongated outer tube (3).

Soichiro Kawakami further teaches the gas delivery metering tube further comprising a single gas supply port (inherent, feeding item 5, Figure 1) coupled to the inlet end (at cut away of item 5) of the elongated inner tube (5) for supplying gas to the metering tube.

Soichiro Kawakami does not teach:

i. a gas flow divider positioned adjacent the inlet ends of the elongated inner and outer tubes (5,3) and having a first gas flow path coupled to the elongated inner tube (5) and a second gas flow path coupled to the annular space (20) between the elongated inner and outer tubes (3,5).

ii. Soichiro Kawakami's gas delivery metering tube wherein the cross sectional area of the inside of the elongated inner tube (5) is approximately equal to the total cross sectional area of the plurality of small orifices in a flow divider

iii. Soichiro Kawakami's inner tube (5) extends a distance at least encompassing the arrays of orifices in the outer tube (3)

iv. Soichiro Kawakami's array of orifices (15) formed in the elongated outer tube (3) are configured to establish uniform backing pressure with Soichiro Kawakami's annular space (20), as claimed by amended claim 1 - However, when the structure recited in the reference is substantially identical to that of the claims (see Applicant's Figure 5, 6a; [0031]), claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Ohashi teaches a fluid flow divider (upper portion of 41, Figure 4) having a first flow path ("Sz") and a second gas flow path (Sx) coupled to an annular space (Sx). Ohashi further teaches the fluid flow divider being a disk (Figure 4) having a central orifice (17a) forming the first gas flow path and a plurality of small orifices (17b) forming the second gas flow path.

Ohashi further teaches a gas flow divider (upper portion of 61, Figure 6) which comprises a flange (see L shape of U/21 face, Figure 6) on the inlet end of the elongated inner tube (21, Figure 6), the flange having a lip (20, Figure 6) containing a plurality of small orifices (20a, Figure 6) forming the second gas flow path.

It would have been obvious to one of ordinary skill in that art at the time the invention was made to replace Soichiro Kawakami's support plate (4) with Ohashi's fluid flow divider, with an optimal number of orifice (17a), including optimizing the dimension(s) of Soichiro Kawakami's gas delivery metering tube and inner tube.

Motivation to replace Soichiro Kawakami's support plate (4) with Ohashi's fluid flow divider, with an optimal number of orifice (17a), including optimizing the dimension(s) of Soichiro Kawakami's gas delivery metering tube and inner tube as taught by Ohashi is for preventing particle adherence as taught by Ohashi ([0003], [0004]; Machine Translation) in Soichiro Kawakami's reactor (Figure 3). Further, motivation to dimension Soichiro Kawakami's gas delivery metering tube and inner tube wherein the cross sectional area of the inside of the elongated inner tube is approximately equal to the total cross sectional area of the plurality of small orifices in the flow divider is to provide for the desired pressure gradient. Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert.

denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soichiro Kawakami (JP61037969) and Ohashi (JP10-177960) in view of Ishii (USPat. 5,685,942). Soichiro Kawakami and Ohashi are discussed above. Soichiro Kawakami and Ohashi do not teach:

i. a gas supply port comprising a block having a pocket formed therein, the pocket being sealed with a cover to create a confined passage, and a gas supply connector coupled to the pocket for receiving a gas and a hollow tube assembly coupled to the pocket and the inlet end (4/3 interface) of the inner and outer tube (3)s for conveying the gas.

Ishii teaches gas delivery system (91, 89, 85; Figure 4) for a wafer processing apparatus (column 3, lines 37-49). Specifically, Ishii teaches:

ii. a gas supply port (91; column 8, lines 16-22) comprising a pipe {block} having a pocket (conduit volume) formed therein, the pocket being sealed with a cover (pipe 91) to create a confined passage (conduit volume), and a gas supply connector (92) coupled to the pocket for receiving a gas and a hollow tube (89) assembly coupled to the pocket

It would have been obvious to one of ordinary skill in that art at the time the invention was made to replace the gas conduit of Soichiro Kawakami and Ohashi with Ishii's gas supply port comprising a block instead of a pipe shape.

Motivation to replace the gas conduit of Soichiro Kawakami and Ohashi with Ishii's gas supply port comprising a block instead of a pipe shape is to provide an alternate and equivalent means for process gas delivery. Additionally, it has been established that the shape of a container is a

matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container is significant (In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966); MPEP 2144.04).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soichiro Kawakami (JP61037969) and Ohashi (JP10-177960) in view of Lemp (USPat. 4,836,246). Soichiro Kawakami and Ohashi are discussed above. However Soichiro Kawakami and Ohashi do not teach one or more standoff spacers attached to the elongated inner tube to axially align the elongated inner tube inside the outer tube.

Lemp teaches a similar gas distribution arrangement (Figure 1; column 2, lines 24-40). Specifically, Lemp teaches a standoff spacer (16, Figure 1) attached to the elongated inner tube (32) to axially align the elongated inner tube (32) inside the outer tube (12).

It would have been obvious to one of ordinary skill in that art at the time the invention was made to add a standoff spacer attached to the elongated inner tube to axially align the elongated inner tube inside the outer tube in the Soichiro Kawakami and Ohashi apparatus as taught by Lemp.

Motivation to add a standoff spacer attached to the elongated inner tube to axially align the elongated inner tube inside the outer tube in the Soichiro Kawakami and Ohashi apparatus as taught by Lemp is to support the elongated inner and outer tubes (column 2, lines 35-40).

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soichiro Kawakami (JP61037969) and Ohashi (JP10-177960) in view of DeDontney, Jay B. et al (USPat. 5,849,088). Soichiro Kawakami and Ohashi are discussed above. Soichiro Kawakami and Ohashi do not teach at least one injector assembly having at least one port for receiving the gas

delivery metering tube. Soichiro Kawakami and Ohashi do not teach at least one shield assembly having at least one plenum for receiving the gas delivery metering tube.

DeDontney teaches a similar gas delivery system (Figure 3; column 5, line 61 – column 6, line 34). Specifically, DeDontney teaches an injector (14, Figure 3) and at least one shield assembly (40c,d; Figure 4) having at least one plenum (78) for a gas delivery metering tube (80).

It would have been obvious to one of ordinary skill in that art at the time the invention was made to provide a port in DeDontney's injector assembly for Soichiro Kawakami' and Ohashi's gas delivery metering tube including replacing DeDontney's gas delivery metering tube with Soichiro Kawakami's and Ohashi's gas delivery metering tube.

Motivation to provide a port in DeDontney's injector assembly for Soichiro Kawakami' and Ohashi's gas delivery metering tube including replacing DeDontney's gas delivery metering tube with Soichiro Kawakami's and Ohashi's gas delivery metering tube is to distribute process gas as taught by Soichiro Kawakami.

Response to Arguments

7. Applicant's arguments filed December 8, 2006 have been fully considered but they are not persuasive.

8. Applicant states:

"

Applicants maintain the position that there are no motivation and no likelihood of success in combining Soichiro with Ohashi, and no suggestion in either reference for such as combination. The object of Soichiro is to overcome the shortcomings of the conventional plasma CVD apparatus shown in FIG. 4 in Soichiro, which is reproduced below. The conventional plasma

CVD apparatus has coaxial electrodes including a cathode la and a counter electrode (not shown) facing the cathode 1a and serving as a support for a substrate on which a thin film is formed by deposition. The peripheral wall of the cathode is provided with a plurality of gas-spraying openings 7a disposed at regular intervals in the peripheral and axial directions.

"

9. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Examiner believes the proposed motivation, found in the references themselves, to replace Soichiro Kawakami's support plate with Ohashi's fluid flow divider, is taught by Ohashi because Ohashi's flow divider is employed for preventing particle adherence ([0003], [0004]; Machine Translation) during gas distribution. Such a particle adherence would deteriorate the flow characteristics resulting in uneven film processing as well as particulate contamination as discussed repeatedly in the machine translation of Ohashi. Indeed, the above proposed combination results in a gas flow divider configured to divide gas from a single gas supply port (Ohashi's 19) coupled to one end of Soichiro Kawakami's gas delivery metering tube.

10. Applicant states:

"

This rejection is respectably traversed. Applicants see no motivation or suggestion in either of the references for such a combination. Reaction gases do not usually form particles before they are introduced into the reaction chamber, where heat or plasma enhancement cause reactions to happen. Otherwise, the gas tubes, such as the tube 5, for supplying the reactions gases would be easily congested and have to be constantly flushed to get rid of the particles. The problems of the gas eddy flow and the "disturbance of gas" in Ohashi, which happens in the reaction chamber 71, simply do not occur within the cathode 1 in Soichiro because Soichiro employs neither a heater nor a rotating element in the cathode 1 to cause such problems. What Soichiro really attempts to do is to carefully design the gas flow paths through the layered openings 13, 14, and 15 in the partitions 2 and 3 and the cathode 1 so that reaction gas may be introduced uniformly into the reaction chamber through the cathode 1. It is unreasonable to assume that Soichiro would take the approach of Ohashi by blowing the non-reacted reaction gas away through some exhaust before the gas ever gets out of the cathode 1, in order to avoid particle formation in the cathode 1.

"

11. In response, the Examiner disagrees. In particular, the Examiner takes issue with Applicant's statement that "Reaction gases do not usually form particles before they are introduced into the reaction chamber". This statement is completely antithetical to *chemical vapor deposition* apparatus, plasma or nonplasma, which require reactivity among reactants to react and nucleate on the substrate and deposit films of desired compositions (See Ohashi - [0003], [0004]; Machine Translation). That Ohashi is specific in stating that the problem to be

solved (abstract) in his apparatus is to prevent particles from attaching is a gleaming example of such a deposition mechanism (See Ohashi - [0003], [0004]; Machine Translation).

12. Applicant states that there is no reasonable likelihood of success because:

"

if there were problems with particle formation within the cathode 1 because of the introduction of the reaction gas into the buffers 18, 19, and 20 through tube 63 and the openings 14 and 15 in the partitions 2 and 3, there is no reason to assume that introducing the same reaction gas through the cathode support plate 4 would make any difference in particle formation. Moreover, introducing gas into the spaces between the cathode 1 and partition 2, the partitions 2 and 3, and/or the partitions 3 and 62 from the bottom of the partitions would disturb the gas flow paths carefully designed in Soichiro, destroy the gas distribution uniformity Soichiro attempts to achieve, and defeat the purpose of the invention in Soichiro. As shown in FIG. 1 in Soichiro, which is reproduced above, if the reaction gas is introduced into the buffers 18, 19, and 20 through the cathode support plate 4, more reaction gas will get through the openings 13, 14, and 15 near the cathode support plate 4.

"

In response, the Examiner disagrees. In particular if Kawakami were to use the same processing gasses as Ohashi, the Examiner argues that the same, if not more intense, particulate problem that Ohashi is trying to avoid would be even more pronounced in the apparatus of Kawakami due to Kawakami's more intricate and circuitous flow pattern(s) resulting, prior to the combination, in what Ohashi discusses as "vortices" that create sources for particulate formation (Ohashi [0020]).

13. Applicant states:

"

...the top portion of the reactor 41 in Ohashi is not a gas flow divider. A gas flow divider, as commonly known and as recited in Claim 1, should divide a gas flow from a single gas supply port into a plurality of gas flow paths into separate areas.

"

14. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., see above) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, the broadest reasonable interpretation of "a gas flow divider" is believed to be encompassed by Ohashi's upper portion of reactor 41 which shows gases divided, not mixed. Further:

15. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from

8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

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